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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/709,454	11/13/00	MATSUI	M 1-99

023400  
LAW OFFICE OF DAVID G POSZ  
2000 L STREET, N.W.  
SUITE 200  
WASHINGTON DC 20036

QM12/1106

EXAMINER

SHAKERI, H

ART UNIT

PAPER NUMBER

3723

DATE MAILED:

11/06/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/709,454

Applicant(s)

MATSUI, MASAKI

Examiner

Hadi Shakeri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 02.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the a polishing cloth as claimed in claims 37, 39, 40 and 43 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

### ***Claim Objections***

2. Claims 25, 30 and 32 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

The above claims are narrative and recite functional language and intended use; they do not further limit the apparatus by introducing any structures or elements.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 9, 10, 13, 19, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kikuchi et al., "Mechanochemical Polishing of Silicon Carbide Single Crystal with Chromium Oxide Abrasive".

Kikuchi et al. discloses all the limitations of claim 1, i.e., a method of Chemical Mechanical Polishing (CMP) using chromium oxide and an oxidizing agent,  $\text{Cr}_2\text{O}_3$  and air, page 193.

Regarding claims, 9, 10, 13 and 20, Prior Art (PA) as applied above meets the limitations.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 14, 15, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido, US Patent No. 5,800,577 and Urushidani et al., US Patent No. 5,750,434.

Kido discloses all of the limitations of claim 1, i.e., polishing composition for chemical mechanical polishing comprising an oxidizing agent and abrasive grains, except for disclosing the step of providing abrasive grains made of chromium oxide. Urushidani et al., teaches a method of polishing silicon carbide utilizing chromium oxide.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the composition of Kido with abrasive grains as taught by Urushidani et al. to adapt the composition (inherently a method) for polishing a surface of a silicon carbide substrate, Urushidani et al., col. 1, line 11.

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Regarding claims, 2-4, 20 and 21, PA as applied above meets the limitations.

Regarding claims 14 and 15, PA as applied above meets the limitations, i.e., cerium oxide, or other elements in the composition.

7. Claims 5-11, 13, 16, 17, 22-25, 29, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kido in view of Urushidani) as applied to claims 1 and 22 above, and further in view of Graebner et al., US Patent No. 5,674,104.

PA as applied to claim 1 above meets all the limitations of claim 5, except for disclosing the use of solid powder as an oxidizing agent. Graebner et al. teaches a diamond polishing method employing oxygen emitting medium. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to further modify the method of PA with the different embodiments of utilizing oxidizing agents as taught by Graebner et al. as other means of emitting oxygen in the polishing process.

Regarding claims 6-11, 13-16, 22-25, 29, 30, and 32, PA as applied above meets the limitations (regarding claim 13, inducing oxygen, Graebner et al., col. 1, line 61).

Regarding the material used, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

8. Claims 12, 27, 34-39 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kido in view of Urushidani and Graebner) as applied to claims 9 and 22 above, and further in view of Nagahara et al., US Patent No. 5,816,900.

Prior Art as applied above meets all the limitations of the above claims except for supplying the gas to the surface through the member. Nagahara et al. teaches apparatus for polishing a substrate wherein the fluid is delivered through the polishing pad. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA with the fluid delivery system as taught by Nagahara et al. for more uniform polishing removal rate.

Regarding the material used for the cloth, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

9. Claims 18, 19, 28, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kido in view of Urushidani and Graebner) as applied to claims 1, 14 and 22 above, and further in view of Satake et al., US Patent No. 6,012,967.

Prior Art as applied above meets all the limitations of the above claims except for a heating means, e.g., a light source to irradiate the oxidizing agent. It is known in the art as evident by Satake et al. to use a light source for heating or irradiating in a chemical mechanical polishing. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA by using a light source for heating or irradiating as taught by Satake et al. for more uniform polishing removal rate.

**10.** Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kido in view of Urushidani and Graebner) as applied to claim 22 above, and further in view of Ban et al., US Patent No. 6,012,966.

Prior Art as applied above meets all the limitations of the above claims except for a hermetically sealed vessel. Ban et al. teaches a precision polishing apparatus with detecting means with hermetically sealed units. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA by using the sealed unit as taught by Ban et al. to increase the efficiency.

**11.** Claims 2-11, 13-17, 19-25, 29, 30, 32, 34 and 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. in view of Towery et al., US Patent No. 6,270,395.

Kikuchi et al. as described above, under 35USC102, meets all the limitations of claim 2, except for an oxidizing chemical liquid. It discloses that  $\text{Cr}_2\text{O}_3$  possibly operates catalytically and enhances the surface oxidation during polishing. It is known in the art to use oxidizing agents to enhance polishing process, as evident by Towery et al. teaching oxidizing polishing slurries for removal of low dielectric materials. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method of Kikuchi et al. with an Oxidizing agent as taught by Towery et al. to enhance the chemical mechanical process.

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Regarding claims 3-10, 13-16, 19-25, 29, 30, 32 and 34, PA as applied above meets the limitations.

Regarding claim 11, PA does not disclose spraying the gas to a member, but it discloses spraying the oxidizing agent to the polishing pad. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA (Kikuchi in view of Towery) to spray oxygen to the polishing pad as an alternative and inexpensive means of delivering the oxidizing agent.

Regarding claims 17 and 36-39, PA discloses the claimed invention except for specified materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use titanium dioxide, cadmium sulfide, diindium trioxide or different type of polishing pad, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

**12.** Claims 12, 27, 35 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kikuchi et al. in view of Towery et al.) as applied to claims 9 and 34 above, and further in view of Nagahara et al., US Patent No. 5,816,900.

Prior Art as applied above meets all the limitations of the above claims except for supplying the gas to the surface through the member. Nagahara et al. teaches apparatus for polishing a substrate wherein the fluid is delivered through the polishing pad. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA with the fluid delivery system as taught by Nagahara et al. for more uniform polishing removal rate.



Regarding the material used for the cloth, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

**13.** Claims 18, 19, 28, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kikuchi et al. in view of Towery et al.) as applied to claims 14, 22 and 29 above, and further in view of Satake et al., US Patent No. 6,012,967.

Prior Art as applied above meets all the limitations of the above claims except for a heating means, e.g., a light source to irradiate the oxidizing agent. It is known in the art as evident by Satake et al. to use a light source for heating or irradiating in a chemical mechanical polishing. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and apparatus of PA by using a light source for heating or irradiating as taught by Satake et al. for more uniform polishing removal rate.

**14.** Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (Kikuchi et al. in view of Towery et al.) as applied to claim 22 above, and further in view of Ban et al., US Patent No. 6,012,966.

Prior Art as applied above meets all the limitations of the above claims except for a hermetically sealed vessel. Ban et al. teaches a precision polishing apparatus with detecting means with hermetically sealed units. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method and

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apparatus of PA by using the sealed unit as taught by Ban et al. to increase the efficiency.

***Conclusion***

15. Prior art made of record and not relied upon are considered pertinent to applicant's disclosure. Kimura et al., Chamberlin et al., Sandhu et al., Aoki, Yamamoto, Black et al., Komanduri et al. and Molnar are cited to show related inventions.

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Hadi Shakeri at (703) 308-6279, FAX (703) 746-3279 for unofficial documents. The examiner can normally be reached on Monday-Thursday, 7:30 AM to 6:00 PM.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-1148.

  
DERRIS H. BANKS  
PRIMARY EXAMINER

HS



October 31, 2001